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10/566,326	01/27/2006	Haruhiko Murase	4344-060126	3518

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EXAMINER	
HWU, JUNE	

ART UNIT	PAPER NUMBER
1661	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,326	MURASE ET AL.	
	Examiner	Art Unit	
	JUNE HWU	1661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *1,2 and 9-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-8* is/are rejected.

7)☒ Claim(s) *3-8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/14/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's election with traverse of Group II, claims 3-8 in the reply filed on March 17, 2008 is acknowledged.

The traversal is on the ground(s) that Hiraoka (U.S. Patent No. 5,476,523) discloses a method of proliferating plants while the instant invention relates to growth of moss seedlings (p. 2 or reply).

This is not found persuasive because Hiraoka describes a method of growing moss seedlings to produce a dense moss seedling (col. 2, lines 27-29).

Applicants urge that Hiraoka describes in Example 1 that carbon dioxide was added to the seedlings and the instant invention requires oxygen (p.3 of reply).

This is not found persuasive because claim 3 states “includes oxygen” meaning that it could also include carbon dioxide.

Applicants urge that Hiraoka describes a small sized shaking culture of sterilized moss seedling, whereas the instant invention discloses mass production of moss seedlings.

This is not found persuasive because the end result is the production of moss seedling in large quantity in a short period of time (col. 12, lines 8-11).

Group I is a method of producing young moss seedlings in nutrient solution while Group II is a method of producing young moss seedlings with oxygen and specific temperature ranges and specific photosynthetic active photon flux density. Thus, Groups I and II are different methods of producing young moss seedlings.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1, 2 and 9-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking

claim. Applicant timely traversed the restriction (election) requirement in the reply filed on March 17, 2008.

Drawings

The drawings filed on January 27, 2006 are approved.

Status of the Claims

Claims 1, 2 and 9-20 are withdrawn; claims 3-8 will be examined on the merits.

Objections to the Claims

Claims 3-8 are objected to because of the following informalities:

Claims 3 and 4 recite plurality of steps. MPEP 608.01 (m) states that "Where a claim sets a plurality of elements or steps, each element or step of the claim should be separated by a line indentation, 37 CFR 1.75(i)".

Claim 3, line 2 is objected to because the phrase "the young moss seedlings letting" is grammatically incorrect. A word or comma appears to be missing between "seedlings" and "letting".

Claims 5-8 at line 2 are objected to because an article is missing after "wherein".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3 and 5-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent claims are included in all rejections.

Claim 3 recites the limitation "the gametophytes of moss" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 5 and 6 recite the limitation "moss" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claims 7 and 8 recite the limitation "fertilizer concentration" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "said nutrient solution" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Claim 7 is dependent on claim 3, which does not cite a "nutrient solution".

Claim 8 recites the limitation "said nutrient solution" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. Claim 8 is dependent on claim 4, which does not cite a "nutrient solution".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiraoka et al (U.S. Patent No. 5,476,523) in view of Meyer (American Journal of Botany, 1940; 27(4): 221-225).

The claims are drawn to a method of producing young moss seedlings by growing the moss seedlings and letting a gaseous body which includes oxygen in contact with the gametophytes of moss intermittently or aerating and stirring the young moss seedlings wherein the temperature range is 0-60ºC and photosynthetic active photon flux density (PPFD) is not greater than 200 $\mu molm^{-2}s^{-1}$.

Hiraoka et al teach a method of culturing moss tissues such as stems, leaves, etc. which would include gametophyte (col. 9, line 1). A gametophyte is described in the specification as having a leafy gametophyte (p. 9 of instant specification). The types of true moss of Hiraoka et al method include the genus *Polytrichum Leucobryum, Dicranum, Hypnum,* Syphagnum, etc. The moss tissues or gametophytes are cut and sterilized and cultured in a 1/5 NA-MS culture media (liquid) containing 0.1-10 μM of growth substance at a temperature of 20-25ºC, which is between 0-60ºC for 30 to 60 days while shaking at 110-120 rpm/min and illuminating a light of about 1000-3000 lux (col. 9, lines 8-12). The conversion of 1000 lux to 3000 lux is 12.1 $\mu molm^{-2}s^{-1}$ to 36.3 $\mu molm^{-2}s^{-1}$ under cool white fluorescent lamp, which is under 200 $\mu molm^{-2}s^{-1}$. The moss tissues eventually grew into moss seedlings.

Hiraoka et al do not teach that the gaseous body includes oxygen which is in contact with the gametophytes of moss intermittently and aerating and stirring.

Meyer teaches a method of developing leafy gametophytes of *Physcomitrium turbinatum* (Urn Moss) in liquid media. Mature capsules of Urn Moss were opened by sterilized needles

and the spores were scattered on the nutrient solution (Benecke's solution and Detmer's solution). After germination the protonemata were transferred to a nutrient culture in Erlenmeyer flask containing 100 cc. of solution. The nutrient solution was changed once a month, thus allowing air, which includes oxygen into the flask, intermittently. The cultures were rotated at frequent intervals so the protonemal threads would not stick to the bottom or sides of the flask. Gas bubbles that accumulated along the filaments were freed by using a glass needle so that the protonemata would not float to the surface (p. 222, left col. 1st par.). By using the glass needle to free the filament, the culture is being stirred. The cultures were kept at normal laboratory temperature and the light source was an artificial cool light (p. 222, left col. 2nd par.). The conversion of an artificial cool light is 36.3 $\mu molm^{-2}s^{-1}$, which is under 200 $\mu molm^{-2}s^{-1}$. The average room temperature of 20-25 ºC is between 0 to 60ºC.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of producing moss seedling as taught by Hiraoka et al and to combine that method by letting a gaseous body, which includes oxygen contact the gametophytes of moss intermittently and aerating and stirring as taught by Meyer. Meyer et al taught that the filaments in the flask were probably stirred so that the protonemata would not float to the top of the surface. By stirring the culture as taught by Meyer, bubbles would form, thus a gaseous body including oxygen is in contact with the gametophyte. Moreover, Meyer taught that the nutrient solution is replaced every month or intermittently and by doing so would allow air which would include oxygen into the culture. One of ordinary skill in the art would have been motivated to produce young moss seedling because mosses are important for the environment in that when excessively removed from forests and mountains by collectors the ability of the forests and mountains to retain water would be low, thus causing landslide, flooding, etc. (col. 2, lines 14-18 of Hiraoka et al). Furthermore, one of ordinary skill in the art would have a

reasonable expectation of success in the combination of producing moss seedling as taught by Hiraoka et al and contacting the gametophyte with a gaseous body which includes oxygen and contacting the gametophyte of moss intermittently as taught by Meyer because both Hiraoka and Meyer produced growth of young moss seedlings. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiraoka et al in view of Meyer as applied to claims 3-4 above, and further in view of Sabovljevic et al (Turk. J. Bot. 27 (2003) 441-446).

The claim is drawn to a method of producing young moss seedlings by growing the moss seedlings and letting a gaseous body which includes oxygen in contact with the gametophytes of moss intermittently or by aerating and stirring, wherein the temperature range is 0-60ºC and photosynthetic active photon flux density (PPFD) is not greater than 200 $\mu molm^{-2}s^{-1}$ and further growing the moss by repeating light periods and dark periods in cycles of 24 hours or less duration.

The teachings of Hiraoka et al in view of Meyer are discussed above.

Hiraoka et al in view of Meyer do not teach that the moss is grown by repeating light periods and dark periods in cycles of 24 hours or less duration.

Sabovljevic et al taught a method of growing moss by culturing apical shoots of the gametophytes of *Eurhychium praelongum* (p. 442, right col. 1st full par.). The apical shoots were sterilized and transferred to a Petri dish containing 20 ml basal medium (p. 442, right col., 2nd full par.). The cultures were grown at 25ºC, which is between 0-60 ºC and under cool-white fluorescent light (33.5-45 $mmol/sm^2$ irradiance) and day/night cycles of 16/8 hours (p. 443, left

col., 1st par.). The plants were subcultured at one month interval. Secondary protonema developed in 3 months after *in vitro* culture in MS_1 (p. 443, right col. 1st full par. and Table 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of producing young moss seedlings as taught by Hiraoka et al in view of Meyer and to combine it with the method of repeating light/dark periods as taught by Sabovljevic et al. One of ordinary skill in the art would have been motivated to do so given that 40% of the moss species are endangered and there is a need to protect them and one way is by reproduction (Sabovljevic et al, p. 442, left col., 1st par.). Furthermore, one of ordinary skill in the art would have a reasonable expectation of success in the combination of producing young seedling moss as taught by Meyer and growing the moss by repeating light/dark periods as taught by Sabovljevic because both produced growth of mosses. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiraoka et al in view of Meyer as applied to claims 3-4 above, and further in view of Virtanen et al.

The claims are drawn to a method of producing young moss seedlings by growing the moss seedlings and letting a gaseous body which includes oxygen in contact with the gametophytes of moss intermittently or by aerating and stirring, wherein the temperature range is 0-60ºC and photosynthetic active photon flux density (PPFD) is not greater than 200 $\mu molm^{-2}s^{-1}$ and further comprising the fertilizer concentration in the nutrient solution is 0 to 1.0 (ms/cm).

The teachings of Hiraoka et al in view of Meyer are discussed above.

Hiraoka et al in view of Meyer does not teach that the fertilizer concentration is 0 to 1.0 (ms/cm).

Virtanen et al taught effects of fertilizer in bryophyte biomass. Virtanen et al taught that bryophyte biomass was greater when farm yard manure and fishmeal were applied to the plot (p. 133, left col., last par., p. 139, left col., 1st full par. and Fig. 1). Farm yard manure and fishmeal are both fertilizers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of producing young moss seedlings as taught by Meyer and to combine the method of fertilizing the moss seedling as taught by Virtanen et al. Virtanen et al are silent to the concentration of fertilizer but it would have been obvious to one of ordinary skill in the art to adjust the amount of fertilizer concentration to achieve the desired results, more moss seedlings. Moreover, Virtanen et al have shown that bryophyte biomass increased when farm yard manure and fishmeal were applied. It would have been obvious to one of ordinary skill in the art to try to fertilize the young moss seedlings because Virtanen taught that when fertilizer was applied to the mosses an increase of biomass was noted. Thus, the invention as a whole was clearly *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Conclusion

No claims are allowed.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to June Hwu whose telephone number is (571) 272-0977. The Examiner can normally be reached Monday through Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anne Marie Grunberg, can be reached on (571) 272-0975. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/June Hwu/
Examiner, Art Unit 1661